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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/652745
Filing Date: 08/29/2003
Appellant(s): Schasteen et al.

Kathryn J. Doty
100 South Fourth Street, Suite 1100
St. Louis, MO 63102
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 06/01/2010.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments*

The appellant's statement of the status of amendments contained in the brief is correct.

(5) *Summary of claimed subject matter*

The summary of claimed subject matter contained in the brief is correct.

(6) *Grounds of Rejection to be Reviewed on Appeal*

The appellant's statement of the issues in the brief is correct.

Grounds of Rejection to be Reviewed on Appeal:

A. The rejection of claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), and further in view of Bland et al. (US 5,591,467).

B. The rejection of Claims 88-89 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and in view of Pinski et al. (US 2002/0172737, PTO-892).

C. The rejection of claims 94-95 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Friedman et al. (US 4,495,208, PTO-892).

D. The rejection of claims 114, 123, 126, 129, 132 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Rolow et al. (US 6,355,289, PTO-892).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied upon

US 4,824,686	Dunn et al.	1989
US 2,938,053	Blake et al.	1960

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International Pig Topics	Buttin	
US 5,591,467	Bland	1997
US 2002/0172737	Pinski et al.	2002
US 4,495,208	Friedman et al.	1985
US 6,355,289	Rolow et al.	2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), and further in view of Bland et al. (US 5,591,467).

Dunn et al. teaches a method of killing microbes in animal feed such as pig feed, cattle feed, or poultry feed comprising treating animal feed with a binary blend of formic acid and propionic acid (preservative composition). See column 1-column 2; column 5-column 6. It is also taught that using a specific blend of formic acid and propionic acid,

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synergism is observed in respect of both their antimold and antibacterial activity. See column 1, lines 30-35. It is also taught that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone. See column 6, lines 30-34. Dunn et al. teaches that the preservative composition can be applied to feedstuff to be preserved in the form of an aqueous solution of the blend or the blend can be impregnated on a solid carrier such as e.g. silica and then mixed with the feedstuff to be preserved. See TABLE 3, wherein Broiler feed is employed in the BioAdd Blend which contains formic acid, propionic acid, and sulfuric acid. It is also taught that the animal feed to which the preservative composition is applied may be pelleted or mash form. See column 1, lines 59-64. Dunn et al. also teaches that other C1-C4 aliphatic carboxylic acids have anti-mold activity and have been used as preservatives for crops and animal feedstuffs. See column 1, lines 10-15

Dunn et al. do not teach the employment of 2-hydroxy-4-(methylthio)butanoic acid in the preservative compositions therein.

The prior art references do not specifically teach the employment of organic acids such as lactic acid, butyric acid.

The prior art references do not teach the particular amounts of 2-hydroxy-4-(methylthio)butanoic acid, lactic acid, butyric acid.

Blake et al., teaches that Alimet, 2-hydroxy-4-(methylthio)butanoic acid has antimicrobial activity, antifungal activity and thus on mixing Alimet (2-hydroxy-4-(methylthio)butanoic acid) with food kills microbes. Blake et al. teaches that Alimet is

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used in poultry feed, and is more effective than methionine as a poultry nutrient. See column 1. Buttin et al. teaches that in addition to providing a methionine source, as an organic acid 2-hydroxy-4-(methylthio)butanoic acid reduce feed pH, and provides relatively strong acid effect with a pKa of 3.6 (formic acid pKa = 3.75), and an acid structure similar to lactic acid. Buttin also teaches that diet acidification is an alternative to antibiotic use in piglet diets.

Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and kill bacteria in solution. See column 9, lines 5-10.

It would have been obvious to a person of ordinary skill in the art at the time of invention to add 2-hydroxy-4-(methylthio)butanoic acid to the preservative composition taught by Dunn et al. because Blake et al., teaches that 2-hydroxy-4-(methylthio)butanoic acid is an effective nutrient in poultry feed, and Blake et al., Buttin et al. teaches that 2-hydroxy-4-(methylthio)butanoic acid has antimicrobial activity. It is generally considered *prima facie* obvious to combine compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose such as for killing microbes in food. The idea for combining them flows logically from their having been used individually in the prior art as antibacterial agents. As shown by recited teachings of Dunn et al., and Blake et al., the instant claims contain agents such as hydroxy-methylthio butanoic acid, propionic acid, formic acid, useful as antimicrobial agents. *In re Kerkhoven*, 626 F.2d 848, 205 USPQ 1069 (CCPA 1980).

It would have been obvious to a person of ordinary skill in the art at the time of invention to add organic acids such as lactic acid, butyric acid to the preservative composition taught by Dunn et al. because Bland et al. teaches that lactic acid, butyric acid has antimicrobial activity. It is generally considered *prima facie* obvious to combine compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose. The idea for combining them flows logically from their having been used individually in the prior art. As shown by recited teachings of Dunn et al., Blake et al., and Bland et al., the instant claims contain agents such as hydroxy-methylthio butanoic acid, propionic acid, formic acid, lactic acid, butyric acid useful as antimicrobial agents. *In re Kerkhoven*, 626 F.2d 848, 205 USPQ 1069 (CCPA 1980).

One having ordinary skill in the art at the time the invention was made would have been motivated to determine the effective amounts of 2-hydroxy-4-(methylthio)butanoic acid, organic acids employed in the compositions, since the optimization of effective amounts of known agents, is considered well in the competence level of an ordinary skilled artisan, involving merely routine skill in the art.

It has been held that it is within the skill in the art to select optimal parameters, such as amounts of ingredients, in a composition in order to achieve a beneficial effect. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Furthermore, as the combined teachings of Dunn et al., Blake et al., Bland et al. renders the claimed composition obvious, the property of such a claimed composition will also be rendered obvious by the prior art teachings, since the properties, “the

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organic acid composition kills more Salmonella in the food compared to when the food is treated with any single organic acid that forms the organic acid composition”, “pH of less than about 5”, “pH of about 4 to about 5”, “pH of about 4.5”, and “improved odor” are inseparable from its composition. Therefore, if the prior art teaches the composition or renders the composition obvious, then the properties are also taught or rendered obvious by the prior art. In re Spada, 911 F.2d 705, 709, 15 USPQ 1655, 1658 (Fed. Cir. 1990.) See MPEP 2112.01. Further, it is pointed out that Dunn et al. teach that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone i.e mixtures of organic acids is more potent than using a single organic acid.

Claims 88-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and in view of Pinski et al. (US 2002/0172737, PTO-892).

Dunn et al., and Blake et al., Bland et al. are applied as discussed above.

The prior art references do not specifically teach that the formulations therein are mixed with food for feeding animal such as aquaculture.

Pinski et al. teaches a particulate foodstuff which is effective for feeding aquatic life such as crustaceans, fish, shell fish, comprising a particulate nutrient feed and an antimicrobial agent which provides shelf life for the foodstuff of at least about 6 months.

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See page 1, paragraph [0009]. The antimicrobial agent therein is selected from propionic acid, salt of propionic acid, citric acid or salt thereof. See page 5, claim 8.

It would have been obvious to a person of ordinary skill in the art at the time of invention to employ the formulation comprising 2-hydroxy-4-(methylthio)butanoic acid, organic acids taught by the combination of references to mix with feed for aquatic animal because Pinski teaches that the feed composition for feeding aquatic animals comprise antimicrobial agents.

One of ordinary skill in the art at the time of invention would have been motivated to employ the preservative composition taught by the combination of references in aquatic feed with reasonable expectation of obtaining aquatic feed formulations that have longer shelf life.

Claims 94-95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Friedman et al. (US 4,495,208, PTO-892).

Dunn et al., and Blake et al., Bland et al. are applied as discussed above.

The prior art references do not specifically teach that the formulations therein are mixed with food for feeding companion animal.

Friedman et al. teach that pet food for feeding pets such as dog food contains antibacterial agents.

It would have been obvious to a person of ordinary skill in the art at the time of invention to employ the formulation comprising 2-hydroxy-4-(methylthio)butanoic acid, organic acids taught by the combination of references to mix with feed for companion animals because Friedman teaches that the feed composition for companion animals such as cats, and dogs contain antimicrobial agents.

One of ordinary skill in the art at the time of invention would have been motivated to employ the preservative composition taught by the combination of references in companion animal feed because antimicrobial agents are well known to be used in dog food formulations.

Claims 114, 123, 126, 129, 132 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Rolow et al. (US 6,355,289, PTO-892).

The combination of references do not specifically teach the employment of phosphoric acid, and the particular amounts of said acid.

Rolow teaches a method of extending the shelf life of tortillas made from corn flour by adding mold growth inhibitors i.e preservatives or antimicrobial agents such as acetic acid, propionic acid, butyric acid, benzoic acid, phosphoric acid. See abstract; column 1, lines 55-58; column 3-column 4.

It is generally considered *prima facie* obvious to combine compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose. The idea for combining them flows logically from their having been used individually in the prior art. As shown by recited teachings of the prior art, the instant claims contain antimicrobial agents, hydroxy-methylthio butanoic acid, formic acid, lactic acid, propionic acid, butyric acid, phosphoric acid. *In re Kerkhoven*, 626 F.2d 848, 205 USPQ 1069 (CCPA 1980).

One having ordinary skill in the art at the time the invention was made would have been motivated to determine the effective amounts of 2-hydroxy-4-(methylthio)butanoic acid, organic acids and acidulant employed in the compositions, since the optimization of effective amounts of known agents, is considered well in the competence level of an ordinary skilled artisan, involving merely routine skill in the art.

It has been held that it is within the skill in the art to select optimal parameters, such as amounts of ingredients, in a composition in order to achieve a beneficial effect. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

(10) Response to Arguments

A. The rejection of Claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), and further in view of Bland et al. (US 5,591,467).

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1. The Group I claims under Rejection (Claims 75, 77-85, 90-93, and 134-137), see page 13 of Brief:

Appellant argues that “the Examiner has cited references that show organic acids being generally antimicrobial, without regard to which combinations, if any, are successful at inhibiting a specific microbe, *Salmonella* in food.” See page 14 of Brief.

Appellant’s arguments have been considered, but not found persuasive. It is pointed out that as discussed below the organic acids are known to kill specific microbe *Salmonella*. Dunn et al. teaches a method of killing microbes such as *salmonella* in animal feed such as pig feed, cattle feed, or poultry feed comprising treating animal feed with a binary blend of formic acid and propionic acid (preservative composition). See column 1-column 2; column 5-column 6. Dunn et al. teaches that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone. It is also taught that using a specific blend of formic acid and propionic acid, synergism is observed in respect of both their antimold and antibacterial activity. See column 1, lines 30-35. Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid and combinations thereof have antibacterial properties and kill bacteria, *salmonella* in solution. See column 2, lines 18-24; column 9, lines 5-10. Dunn et al. and Bland et al. also teach that other C1-C4 aliphatic carboxylic acids are used as preservatives for crops and animal feedstuffs. See column 1, lines 10-15 of Dunn et al., and column 9, lines 6-10 of Bland et al.

It would have been obvious to a person of ordinary skill in the art at the time of invention to add organic acids such as lactic acid, butyric acid to the preservative

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composition containing formic acid, propionic acid taught by Dunn et al. for killing *salmonella* because Bland et al. teaches that lactic acid, butyric acid and combinations thereof have antimicrobial activity and kill bacteria, *salmonella* in solution. It is generally considered prima facie obvious to combine compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose. The idea for combining them flows logically from their having been used individually in the prior art.

Blake et al., teaches that Alimet, 2-hydroxy-4-(methylthio)butanoic acid has antibacterial activity, antifungal activity and thus on mixing Alimet (2-hydroxy-4-(methylthio)butanoic acid) with food kills microbes such as bacteria. Buttin et al. teaches that in addition to providing a methionine source in animal feed, as an organic acid 2-hydroxy-4-(methylthio)butanoic acid reduce feed pH, and provides relatively strong acid effect with a pKa of 3.6 (formic acid pKa = 3.75), and an acid structure similar to lactic acid which as discussed above is used as antibacterial agent and kills *salmonella*.

It would have been obvious to a person of ordinary skill in the art at the time of invention to employ 2-hydroxy-4-(methylthio)butanoic acid (HMTBA) in composition taught by Dunn et al, for treating *Salmonella* in food because HMTBA has antibacterial activity, and an acid structure similar to lactic acid which as discussed above is used as antibacterial agent and kills *salmonella*.

Furthermore, as the combined teachings of Dunn et al., Blake et al., Bland et al. renders the claimed composition in the claimed method obvious, the property of such a claimed composition will also be rendered obvious by the prior art teachings, since the

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properties, "the organic acid composition kills more Salmonella in the food compared to when the food is treated with any single organic acid that forms the organic acid composition", are inseparable from its composition. Therefore, if the prior art teaches the composition or renders the composition obvious, then the properties are also taught or rendered obvious by the prior art. In *re Spada*, 911 F.2d 705, 709, 15 USPQ 1655, 1658 (Fed. Cir. 1990.) See MPEP 2112.01. Further, it is pointed out that Dunn et al. teach that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone i.e mixtures of organic acids is more potent than using a single organic acid.

As shown by recited teachings of Dunn et al., Blake et al., and Bland et al., the instant claims contain agents such as hydroxy-methylthio butanoic acid, propionic acid, formic acid useful as preservatives/antibacterial agents in animal feed. It is generally considered prima facie obvious to combine compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose i.e to kill bacteria. The idea for combining them flows logically from their having been used individually in the prior art. As shown by recited teachings of Dunn et al., Blake et al., and Bland et al., the instant claims contain agents such as hydroxy-methylthio butanoic acid, propionic acid, formic acid, lactic acid, butyric acid useful as antimicrobial agents specifically. *In re Kerkhoven*, 626 F.2d 848, 205 USPQ 1069 (CCPA 1980).

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Appellant argues that "The Appellant respectfully object to this comparison and conclusion by the Examiner because formic acid has no inhibitory effect against *Salmonella* - it is a false comparison. Per Enthoven, "[T]he results show there is no inhibitory effect of HMB (2-hydroxy-4- (methylthio)butanoic acid) or formic acid on *Lactobacillus* or *Salmonella*." See pages 8-10, and page 15 of Brief.

Appellant's arguments have been considered, but not found persuasive. Contrary to applicant's remarks as discussed above Dunn et al., and Bland et al. teach that C1-C4 aliphatic carboxylic acids and combination of organic acid are useful in killing bacteria such as *Salmonella*. Dunn et al. teaches a method of killing microbes such as *salmonella* in animal feed such as pig feed, cattle feed, or poultry feed comprising treating animal feed with a binary blend of formic acid and propionic acid. Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and kill bacteria, *salmonella* in solution. Blake et al., teaches that Alimet, 2-hydroxy-4-(methylthio)butanoic acid has antibacterial activity, antifungal activity and thus on mixing Alimet (2-hydroxy-4- (methylthio)butanoic acid) with food kills bacteria. Buttin et al. teaches that in addition to providing a methionine source in animal feed, as an organic acid 2-hydroxy-4-(methylthio)butanoic acid reduce feed pH, and provides relatively strong acid effect with a pKa of 3.6 (formic acid pKa = 3.75), and an acid structure similar to lactic acid which as discussed above kills *salmonella*. Regarding, Enthoven reference, Enthoven reference provides data for HMBTA (2-hydroxy-4- (methylthio)butanoic acid) or formic acid only at particular amounts/concentrations, and pH which does not mean that HMBTA (2-hydroxy-4-(methylthio)butanoic acid) or formic acid do not kill *Lactobacillus* or *Salmonella* at other amounts/concentrations. The antibacterial activity of compounds depends on the

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amounts used, and pH. As discussed above formic acid is well known to kill bacteria, *salmonella* in solution at particular concentrations.

Appellant argues that "As an additional matter, the Examiner has made no finding whatsoever regarding the claim limitation that the "composition inhibits or kills more *Salmonella* in the food compared to when the food is treated with any single organic acid that forms the organic acid composition." See page 15 of Brief.

Appellant's arguments have been considered, but not found persuasive. Contrary to applicant's remarks as discussed above Dunn et al., and Bland et al. teach that C1-C4 aliphatic carboxylic acids and combination of organic acid are useful in killing bacteria in food. Dunn et al. also teaches that combination of formic and propionic acid is a more potent inhibitor of *salmonella* infections than formic acid alone i.e mixtures of organic acids is more potent in killing bacteria than using a single organic acid. Furthermore, as the combined teachings of Dunn et al., Blake et al., Bland et al. renders the claimed composition obvious, the property of such a claimed composition will also be rendered obvious by the prior art teachings, since the properties, "the organic acid composition kills more *Salmonella* in the food compared to when the food is treated with any single organic acid that forms the organic acid composition" are inseparable from its composition. Therefore, if the prior art teaches the composition or renders the composition obvious, then the properties are also taught or rendered obvious by the prior art. In re Spada, 911 F.2d 705, 709, 15 USPQ 1655, 1658 (Fed. Cir. 1990.) See MPEP 2112.01.

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Appellant argues that "Even though the new compounds are deadly to microorganisms, the Blake patent teaches away from use of these variants in animal food and water by reciting they are "not useful as animal feed supplements" and "have toxic effects." (Emphasis Added). Even if these toxic chemicals could theoretically be regulated as applied to the surface of plants or animals to remove certain microorganisms, the Blake patent provides no teachings for how these variant chemicals could be ingested or combined with food supplements." See page 17 of Brief.

These arguments have been considered, but not found persuasive. It is pointed out that contrary to applicant's remarks that "Blake patent provides no teachings for how these variant chemicals could be ingested or combined with food supplement", Blake teaches that 2-hydroxy-4-(methylthio)butyric acid (HMTBA) has been shown to be more effective than methionine as poultry nutrient. See column 1, lines 58-63, lines 67-69. Blake et al., also teaches that the compounds therein have antibacterial activity, antifungal activity and thus on mixing with food kills bacteria. Note that applicant also asserts that the methionine analogs taught in Blake are deadly to microorganisms. Further, Buttin et al. also teaches that HMTBA is employed as a methionine source in animal feed. Buttin et al. also teaches that in addition to providing a methionine source, as an organic acid 2-hydroxy-4-(methylthio)butanoic acid reduce feed pH, and provides relatively strong acid effect with a pKa of 3.6 (formic acid pKa = 3.75), and an acid structure similar to lactic acid which kills *Salmonella*, see above. Buttin also teaches that diet acidification is an alternative to antibiotic use in piglet diets i.e employing HMTBA in animal feed acts also as antibiotic.

Appellant argues that "Although the cited animal feed compositions do include these ingredients, Bland et al. states that the ingredients are not effective at killing bacteria in animal feedstuffs, including *Salmonella*.." See page 18 of Brief.

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These arguments have been considered, but not found persuasive. Instant claim independent 75 is drawn to a method of killing microbes comprising *Salmonella* in food. Instant claims broadly recite food, and food can be in the form of solution. Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and are effective in killing *Salmonella* in solution. Dunn et al. and Bland et al. also teach that other C1-C4 aliphatic carboxylic acids are used as preservatives for crops and animal feedstuffs. It is pointed out that animal feedstuff can be in the form of solution. Thus, Bland et al. when considered in its entirety, i.e., as a whole teaches that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and are effective in killing *Salmonella* in solution which broadly includes animal feed in solution form. It is pointed out that Bland does not teach away from adding the organic acids to animal feed in solution form.

Appellant argues that "The currently claimed invention does not recite or require any formaldehyde. Consequently, Bland provides no expectation of success for using organic acids without the addition of large amounts of formaldehyde." See page 19 of Brief.

These arguments have been fully considered, but not found persuasive as discussed above. Further, it is pointed out that instant claims recite the transitional phrase "comprising", and does not exclude other agents such as formaldehyde in the composition.

Appellant argues that "having DL-HMB instead of DL-methionine as a protein source. There is no statement regarding DL-HMB having an antimicrobial effect on any specific microbe or microbes generally. The Buttin references states that.... ...benefits of diet acidification." However, this fails to indicate that HMBA, or any other acid that

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contributes to acidification, is effective against any particular microbe or *Salmonella* in particular. The Appellant respectfully asserts that the Examiner has cited Buttin out of context." See page 19 of Brief.

Appellant's arguments have been considered. It is pointed out that Buttin was not cited out of context. Buttin reference was employed to show that HMBA (HMTBA) is useful as a methionine source in animal feed. Buttin et al. also teaches that in addition to providing a methionine source, as an organic acid 2-hydroxy-4-(methylthio)butanoic acid reduce feed pH, and provides relatively strong acid effect with a pKa of 3.6 (formic acid pKa = 3.75), and an acid structure similar to lactic acid which kills *Salmonella*, which further supports Blake et al., reference that HMTBA has antibacterial activity.

Appellants remarks that "the Examiner has ignored the experimental results in the original filed specification (e.g., page 70, lines 25-27, "Combinations... were compared to feed treated with propionic acid alone, and the results are shown in Figures 13-15."). (Emphasis added). See also page 81, lines 5-9, which states, "antibacterial effect of two organic acid/Alimet blends were compared with blends containing formic and propionic acids, and with no Alimet following the procedure set forth in Example 12." See pages 6-7 of Brief.

Appellant's remarks have been considered. It is pointed out that the examiner did not ignore the experimental results in original specification. The data in instant specification page 70, lines 25-27 refers to mold inhibition, and thus is not commensurate in scope with instant claims which recite "killing or inhibiting microbes comprising *Salmonella*". The data presented in the specification pages 76-81, shows antibacterial activity of blends at specific amounts/concentrations of individual acids. The antibacterial activity of combination of instant organic acids is expected as discussed above from the prior art, since the individual acids are known to have

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antibacterial activity. Further, instant specification, page 72, paragraph [0654] also recites that "Complete bacteriacidal was seen at the two highest doses tested for all three acids (7.5 and 10 g/L for formic acid; 30 and 50 g/L for butyric and lactic acids) .i.e individual organic acid such as formic acid, butyric acid, lactic acid have antibacterial activity as taught in the prior art.

Appellant argues that "...[w]e have research data, that in my opinion, demonstrates surprising and unexpected results for organic acid formulations falling within the scope of the '434 patent claims attached to this Declaration is a graph (identified as figure 7) that depicts a synergistic effect....,". See pages 5-6, 20-21 of Brief.

Appellants surprising and unexpected results have been considered but not found persuasive because they are not commensurate in scope with instant claims. It is pointed out that the synergistic effect for two organic acid formulations provided by the appellant attached to the Declaration, figure 7, is not convincing because the data provided is for two compositions with particular concentrations of individual ingredients in the blend i.e blend OA 4, which is 0.15% lactic acid, 0.15% propionic acid, and 0.15% HMTBA tested at pH 4; and blend OA 6, which is 0.1% lactic acid, 0.1% butyric acid, 0.1% propionic acid, and 0.15% HMTBA tested at pH 4. The independent claim for example 75 is not limited to only these individual concentration/amounts, and pH. According to claim 75 the composition can contain any amount of HMTBA, and any amounts of organic acids. For, example in the data provided by Appellant HMTBA alone is effective in killing *Salmonella* when used at a concentration of 1 %, and butyric acid alone is effective in killing *Salmonella* when used at a concentration of 1 %. Thus, by

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employing 3 % butyric acid one will not see synergistic effect when combined with other organic acids. Accordingly, the synergistic effect does not hold for all or any amounts/concentration of the individual organic acids in the combination of organic acids. Thus, the evidence in figure 7 is not commensurate in scope with the claimed invention and does not demonstrate criticality of a claimed range of the ingredients i.e amounts of ingredients in the claimed method. See MPEP § 716.02(d). Therefore, the evidence presented in the declaration herein is not seen to support the nonobviousness of the instant claimed invention over the prior art.

Appellants remarks that “The Warnecke et al. review article cites to work done pre-filing to which a skilled artisan would appreciate as indicating unpredictability in the microbial arts. Thus, the general state of knowledge in the microbial arts at the time of filing supports the notion that a random selection of organic acids would be unpredictable for the purpose of the currently claimed invention.” See page 21 of Brief.

Appellants remarks have been considered, but not found persuasive because it is known that the organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and are effective in killing *Salmonella* in solution. As discussed above it would have been obvious to add HMTBA which has antibacterial property, and an acid structure similar to lactic acid which is known to kill *Salmonella* in solution. According to Dunn et al. combination of organic acids such as formic acid and propionic acid is a more potent inhibitor of *salmonella* infections than formic acid alone i.e mixtures of organic acids is more potent in killing bacteria than using a single organic acid. Thus, as discussed above it is not random selection of organic acids, but organic acids which are well known as having antibacterial properties.

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Appellant's remarks that "Bland reference states that "... many compounds with known bacteriocidal properties, such as... propionic acid...and combinations of these have been tested. While many of these agents kill bacteria in solution, they do not kill all the bacteria in animal feedstuffs." See page 24 of Brief.

Appellants remarks have been considered, but not found persuasive as discussed above. Further, regarding "While many of these agents kill bacteria in solution, they do not kill all the bacteria in animal feedstuff", it is pointed out that the agents need not kill all the bacteria in animal feedstuffs because instant claims recite "inhibiting microbes", which means "decrease in growth of bacteria or any decrease in the concentration of bacteria", according to instant specification, see instant specification page 55, .

2. The Group II claims under Rejection (Claims 86 and 87), see page 24 of Brief:

The arguments asserted above are hereby incorporated and reasserted with respect to claims 86 and 87.

3. The Group III claims under Rejection (Claims 115-117), see page 25 of Brief:

The arguments asserted above are hereby incorporated and reasserted with respect to claims 115-117.

Appellant's remarks regarding pH of about 4 to about 5, as the combined teachings of Dunn et al., Blake et al., Bland et al. renders the claimed composition obvious, the property of such a claimed composition will also be rendered obvious by the prior art teachings, since the properties, "the organic acid composition kills more

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Salmonella in the food compared to when the food is treated with any single organic acid that forms the organic acid composition", "pH of less than about 5", "pH of about 4 to about 5", "pH of about 4.5", and "improved odor" are inseparable from its composition. Therefore, if the prior art teaches the composition or renders the composition obvious, then the properties are also taught or rendered obvious by the prior art. In re Spada, 911 F.2d 705, 709, 15 USPQ 1655, 1658 (Fed. Cir. 1990.) See MPEP 2112.01. Further, it is pointed out that Dunn et al. teach that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone i.e mixtures of organic acids is more potent than using a single organic acid.

4. The Group IV claims under Rejection (Claims 121-122, 124-125, 127-128, and 130-131), see page 25 of Brief:

The arguments asserted above are hereby incorporated and reasserted with respect to claims 121-122, 124-125, 127-128, and 130-131.

Appellant's remarks regarding specific percentages, it is pointed out that as discussed above, it would have been obvious to a person of ordinary skill in the art at the time of invention to add organic acids such as lactic acid, butyric acid, HMTBA to the preservative composition containing formic acid, propionic acid taught by Dunn et al. for killing *salmonella* because 1) Bland et al. teaches that lactic acid, butyric acid and combinations thereof have antimicrobial activity and kill bacteria, *salmonella* in solution 2) Blake et al., teaches that Alimet, 2-hydroxy-4-(methylthio)butanoic acid has antibacterial activity. It is generally considered prima facie obvious to combine

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compounds each of which is taught by the prior art to be useful for the same purpose, in order to form a composition which is used for the very same purpose with at least additive effect i.e additive antibacterial effect. The idea for combining them flows logically from their having been used individually in the prior art. Further, it is pointed out that Dunn et al. teach that the mixture of formic acid, and propionic acid is a more potent inhibitor of salmonella infections than formic acid alone i.e mixtures of organic acids is more potent than using a single organic acid. One having ordinary skill in the art at the time the invention was made would have been motivated to determine the effective amounts of 2-hydroxy-4-(methylthio)butanoic acid, organic acids employed in the compositions, since the optimization of effective amounts of known agents, is considered well in the competence level of an ordinary skilled artisan, involving merely routine skill in the art.

B. The rejection of Claims 88-89 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and in view of Pinski et al. (US 2002/0172737, PTO-892) should be affirmed.

The arguments asserted above are hereby incorporated and reasserted with respect to claims 88-89.

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Appellant's arguments regarding Pinski et al. reference have been considered, but not found persuasive. It is pointed out that Pinski et al. reference was employed for its teachings that food for feeding aquatic life contains antimicrobial agents such as propionic acid, citric acid etc. Accordingly, it would have been obvious to a person of ordinary skill in the art at the time of invention to employ the formulation comprising 2-hydroxy-4-(methylthio)butanoic acid, organic acids taught by the combination of references to mix with feed for aquatic animal because Pinski teaches that the feed composition for feeding aquatic animals comprise antimicrobial agents. Furthermore, instant claims broadly recite food, and food can be in the form of solution. Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and are effective in killing Salmonella in solution. Dunn et al. and Bland et al. also teach that other C1-C4 aliphatic carboxylic acids are used as preservatives for crops and animal feedstuffs. It is pointed out that animal feedstuff can be in the form of solution.

C. The rejection of claims 94-95 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Friedman et al. (US 4,495,208, PTO-892) should be affirmed.

The arguments asserted above are hereby incorporated and reasserted with respect to claims 94-95.

Appellant's arguments have been considered, but not found persuasive. Instant claims broadly recite food, and food can be in the form of solution. Bland et al. teach that organic acids such as formic acid, propionic acid, butyric acid, lactic acid have antibacterial properties and are effective in killing Salmonella in solution. Dunn et al. and Bland et al. also teach that other C1-C4 aliphatic carboxylic acids are used as preservatives for crops and animal feedstuffs which can be in solution form. It is pointed out that animal feedstuff can be in the form of solution, and Bland does not teach away from adding the organic acids as discussed above to animal feed in solution form.

Friedman et al. reference was employed for its teachings that pet food for feeding pets contains antimicrobial agents. Accordingly, one of ordinary skill in the art at the time of invention would have been motivated to employ the preservative composition taught by the combination of references in companion animal feed because antimicrobial agents are well known to be used in dog food formulations.

D. The rejection of claims 114, 123, 126, 129, 132 under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (US 4,824,686, PTO-892), in view of Blake et al. (US 2,938,053, PTO-892), Buttin (International Pig Topics, PTO-1449), in view of Bland et al. (US 5,591,467) as applied to claims 75, 77-87, 90-93, 115-117, 121-122, 124-125, 127-128, 130-131, 134-137 above, and further in view of Rolow et al. (US 6,355,289, PTO-892) should be affirmed.

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The arguments asserted above are hereby incorporated and reasserted with respect to claims 114, 123, 126, 129, 132.

Appellant's arguments have been considered, but not found persuasive because Rolow reference was employed for its teachings that phosphoric acid is a well known antimicrobial agent, and is used as a preservative in food for killing bacteria. Accordingly, one of ordinary skill in the art at the time of invention would have been motivated to employ phosphoric acid a well known antibacterial agent in the preservative composition for killing *Salmonella* in food taught by the combination of references because Rolow teaches that phosphoric acid is a well known antibacterial agent, and is used as a preservative in food

For the above stated reasons, said claims are properly rejected under 103(a).

Therefore, it is believed that all the rejections should be sustained.

(11) *Related Proceedings Appendix*

None

Respectfully submitted,

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